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There is no additional fee for this Amendment because the total number of claims is less than twenty and the total number of independent claims is not more than three.

REMARKS

Applicant respectfully requests reconsideration of this Patent Application, particularly in view of the above Amendment and the following remarks.

Request for Telephone Interview

Applicant kindly requests the Examiner to contact the undersigned to schedule a telephone interview, to discuss the merits of this Patent Application.

Amendment to the Claims

Applicant has amended Claim 10 by adding limitations further describing the carrying body (2) of the invention. The added limitations were previously recited in Claims 5, 6, 7 and 11. Support for this Amendment is found on page 6, first paragraph of Applicant's Specification.

Applicant has canceled Claims 5, 7 and 11, as being redundant in view of the Amendment to Claim 10.

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Applicant has amended Claim 6 to delete limitations recited in twice amended Claim 10, and to depend from Claim 3 instead of canceled Claim 5.

Applicant has amended Claim 8 to depend from Claim 6 instead of canceled Claim 7. Applicant has amended Claim 12 to depend from Claim 10 instead of canceled Claim 5.

The Amendment to the claims adds no new matter to this Patent Application.

New Claims

Applicant has added new Claims 13-23 directed to an apparatus for applying a thin-walled flat substrate. Support for new Claims 13-23 is found in FIGS. 1-4 and at pages 6-7 of Applicant's Specification. The Amendment adds no new matter to this Patent Application.

Claim Objections

Claim 11 has been objected to under 37 CFR 1.75(c) as being of improper dependent form for failure to further limit the subject matter of Claim 5 in view of Claims 6 and 7. Applicant has canceled Claim 11, thereby rendering this objection moot.

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Claim Rejections - 35 U.S.C. §112

Claim 11 has been rejected under 35 U.S.C. §112, second paragraph, for the reasons set forth at pages 2 and 3 of the Office Action. Applicant has canceled Claim 11, thereby rendering this rejection moot.

Claim Rejections - 35 U.S.C. §103

Claims 2-3 and 5-12 have been rejected under 35 U.S.C. §103(a) as being unpatentable over the prior art cited in Applicant's Specification in view of the collective teachings of Herklotz, U.S. Patent 6,484,383, and Marks et al., U.S. Patent 3,322,598.

Applicant's invention is a method for applying a thin-walled, flat substrate to an assembly carrier with a protective layer as well as an apparatus for use in the disclosed method. The method includes arranging the substrate at a spacing and curved in a convex manner, contacting the protective layer (5) with the substrate (4), and laying the substrate (4) over the protective layer (5). The substrate is arched and detached from a carrying body (2) by controlling a pressure of a medium in a cavity between the substrate (4) and the carrying body (2). The carrying body (2) includes a portion (8) having a plurality of flow apertures (3, 7) for accommodating the pressure medium. The plurality of flow apertures (3, 7) include at least one centrally

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formed duct (7) configured as an overpressure line and circumferential grooves (3) configured as negative pressure lines. The at least one centrally formed duct (7) causes the substrate to arch and the negative pressure of the circumferential grooves (3) keep the substrate attached to the carrying body during application to the assembly carrier with the protective layer.

The art discussed at page 3, first paragraph, of Applicant's Specification discloses attaching a foil by adhesion to a semiconductor wafer, where the foil is attached as flat as possible. There is no teaching or suggestion to curve the protective foil before attaching it to the semiconductor wafer. In particular, there is no teaching or suggestion to curve a substrate by controlling a pressure of a medium in a cavity between the substrate and a carrying body, as in Applicant's claimed invention.

The Herklotz Patent teaches a method for airtight bonding two membranes. A first membrane 10 is joined to a first housing 30', sealing a first chamber 30, and a second membrane 20 is joined to a second housing 40', sealing a second chamber 40. (Column 3, lines 35-44). The first membrane 10 is convexly curved by increasing the pressure inside the first chamber 30. (Column 3, lines 56-61).

The Herklotz Patent does not teach or suggest a substrate carrying body including a portion for carrying the substrate that includes at least one centrally

formed duct configured as an overpressure line and circumferential grooves configured as negative pressure lines, as in Applicant's invention of twice amended Claim 10. The Herklotz Patent teaches a single diaphragm pump for increasing the pressure in first chamber 30 to curve the first membrane, but does not teach or suggest a negative pressure line for keeping the first membrane 10 attached to the first housing 30'.

The Marks et al. Patent discloses a laminator for securing thin flexible films to curved surfaces. (Column 1, lines 8-10). The laminator uses a vacuum chamber to create a vacuum on both sides of the air-impermeable film, which is clamped about the peripheral edges within the vacuum chamber. (FIG. 4; Column 2, lines 48-68). Air is leaked into an upper chamber on one side of the film causing the film to curve, due to the increase in pressure in the upper chamber, and contact the curved surface. (FIG. 5; Column 2, line 69 - Column 3, line 10).

In another disclosed embodiment of the Marks et al. Patent, the film 20 is secured about the edges between a film support 21 and a plate 57 using an O-ring 62 to seal the edges of the film to the plate 57. (FIG. 9; Column 4, lines 37-44). Air pressure beneath the film 20 is increased via a pump, causing the film 20 to curve outward for attachment to the curved surface. (Column 4, lines 45-59).

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The Marks et al. Patent fixes and seals the edges of a film before an increase in pressure to curve the film. The Marks et al. Patent does not teach or suggest a substrate carrying body including a portion for carrying the substrate that includes at least one centrally formed duct configured as an overpressure line and circumferential grooves configured as negative pressure lines, as in Applicant's invention of twice amended Claim 10.

Neither the Herklotz Patent nor the Marks et al. Patent teach or suggest negative pressure lines at circumferential grooves, as in Applicant's invention of twice amended Claim 10, to secure a substrate to a carrying body. Therefore, it would not be obvious to one skilled in the art reading the art discussed in Applicant's Specification, the Herklotz Patent and the Marks et al. Patent, to arch and detach a substrate from a carrying body by controlling a pressure of a medium in a cavity between the substrate and the carrying body using at least one centrally formed duct configured as an overpressure line and circumferential grooves configured as negative pressure lines, as in Applicant's twice amended Claim 10.


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Conclusion

Applicant believes that the above Amendment and remarks address and overcome each and every issue raised by the Examiner. However, should the Examiner detect any remaining issue, Applicant kindly requests the Examiner to contact the undersigned, preferably by telephone in an effort to expedite examination of this Patent Application.

Applicant sincerely believes that this Patent Application is now in condition for allowance and, thus, respectfully requests early allowance.

Respectfully submitted,



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Marked-up Version Showing Changes Made

In the Claims:

Please cancel Claims 5, 7 and 11 in their entirety.

Please substitute the following Claims 6, 8, 10 and 12 (Twice Amended) for the pending Claims 6, 8, 10 and 12 (Amended):

6. (Twice Amended) The method according to claim [5] 3, wherein the portion (8) is planar [and the flow apertures (3, 7) are centrally formed ducts and circumferential grooves].

8. (Twice Amended) The method according to claim [7] 6, wherein the portion (8) is one of circular, oval and polygonal in cross-section when viewed from above.

10. (Twice Amended) A method for applying a thin-walled, flat substrate to an assembly carrier (6) with a protective layer (5), the improvement comprising:

with respect to the protective layer (5), arranging the substrate at a spacing and curved in a convex manner, contacting the protective layer (5) with the

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substrate (4), and laying the substrate (4) over the protective layer (5) from a contact point towards an edge of the substrate, and the substrate being arched and detached from a carrying body (2) by controlling a pressure of a medium in a cavity between the substrate (4) and the carrying body (2);

the carrying body (2) moveable relative to the assembly carrier (6) and including a portion (8) facing the protective layer (5) and carrying the substrate (4), the portion (8) having a plurality of flow apertures (3, 7) for accommodating the pressure medium, the flow apertures (3, 7) including at least one centrally formed duct (7) configured as an overpressure line and circumferential grooves (3) configured as negative pressure lines.

12. (Twice Amended) The method according to claim [5] 10, wherein the portion (8) is one of circular, oval and polygonal in cross-section when viewed from above.

Please add the following new claims.

13. (New) An apparatus for applying a thin-walled, flat substrate (4) to an assembly carrier (6) with a protective layer (5), the improvement comprising:

with respect to the protective layer (5), a means for arranging the substrate (4) at a spacing and curved in a convex manner for contacting the protective layer (5) and for laying the substrate (4) over the protective layer (5) from a contact point towards an edge of the substrate, wherein the substrate (4) is arched and detached from a carrying body (2) by controlling a pressure of a medium in a cavity between the substrate (4) and the carrying body (2); and

the carrying body (2) moveable relative to the assembly carrier (6) and including a portion (8) facing the protective layer (5) and carrying the substrate (4), the portion (8) having a plurality of flow apertures (3, 7) for accommodating the pressure medium, the flow apertures (3, 7) including at least one centrally formed duct (7) configured as an overpressure line and circumferential grooves (3) configured as negative pressure lines.

14. (New) The apparatus according to claim 13, wherein when laid, the substrate (4) applies a constant pressure on the protective layer.

15. (New) The apparatus according to claim 14, wherein the pressure medium is applied to a side of the substrate (4) remote from the protective layer (5).

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16. (New) The apparatus according to claim 13, wherein the portion (8) is planar.

17. (New) The apparatus according to claim 16, wherein the portion (8) is one of circular, oval and polygonal in cross-section when viewed from above.

18. (New) The apparatus according to claim 13 wherein the pressure medium is applied to a side of the substrate (4) remote from the protective layer (5).

19. (New) The apparatus according to claim 13, wherein the portion (8) is one of circular, oval and polygonal in cross-section when viewed from above.

20. (New) An apparatus for applying a thin-walled flat substrate (4) to an assembly carrier (6) with a protective layer (5), comprising:

a carrying body (2) moveable relative to the assembly carrier (6), the carrying body (2) including a portion (8) facing the protective layer (5);

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the portion (8) including at least one centrally formed duct (7), wherein the centrally formed duct (7) is configured as an overpressure line;

the portion (8) including at least one circumferential groove (3) at a periphery, wherein the at least one circumferential groove (3) is configured as a negative pressure line;

wherein the negative pressure line is adapted to hold the substrate (4), the overpressure line is adapted to arch the substrate (4) outward from the portion (8), and the substrate is detachable from the carrying body (2) by controlling a pressure medium in a cavity between the substrate (4) and the portion (8).

21. (New) The apparatus according to claim 20, wherein the pressure medium is applied to a side of the substrate (4) remote from the protective layer (5).

22. (New) The apparatus according to claim 20, further comprising more than one circumferential groove (3).

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23. (New) The apparatus according to claim 20, wherein the portion (8) is one of circular, oval and polygonal in cross-section when viewed from above.